DEVICE FOR CONNECTING A DATA PROCESSING DEVICE

TO A TELECOMMUNICATIONS SYSTEM

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Background of the Invention:

Field of the Invention:

The invention lies in the telecommunications technology field and pertains, more specifically, to a connection device for connecting a telecommunications system to a data processing device by means of which telecommunications applications are provided for the telecommunications system.

Supplementary services, such as call center applications, voice recognition, and text-to-speech conversion, which are provided primarily in private telecommunications networks, can be implemented with so-called "Computer Telephony Integration" (CTI). The services - hereinafter referred to as telecommunications applications - are normally implemented by means of central CTI servers (e.g. a media framework) provided in the private telecommunications networks, and are made available to a telecommunications system or its users. Telecommunications applications are made available by means of a CTI server of this type, for example according to the S and H recommendations of the Enterprise Computer Telephony Forum (ECTF).

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In order to make the telecommunications applications of a CTI server available to the telecommunications system, a connection - which may be based, for example, on analog, ISDN-

5   oriented or packet-oriented data transmission - is required between the CTI server and the telecommunications system. Control signals and status monitoring between the telecommunications system and the server can be implemented as required via a separate connection according to the CSTA

10   protocol (CSTA = Computer Supported Telecommunications Application).

A connection is established between a CTI server and the telecommunications system via special connection modules -

15   often referred to in the literature as line cards. A connection can be established between a CTI server and the telecommunications system, for example, via connection modules providing analog a/b or digital S_0 or S_{2M} interfaces. TDM-oriented (TDM = Time Division Multiplex) switching networks of

20   the telecommunications system and the CTI server are in each case interconnected with the aid in each case of one connection module in the telecommunications system and the CTI server. In this way, one or more user data channels - for example ISDN-oriented B-channels - of the telecommunications

25   system can be connected to the resources of the CTI server.

The disadvantage of this configuration is that expensive line signaling is required for the connection, i.e. for connection set-up and cleardown between the CTI server and the telecommunications system. The line signaling takes up

5   resources, e.g. processor power and memory capacity, in both the telecommunications system and the CTI server. Under load, this results in some instances in long switching times, particularly in medium-sized and large systems.

10   Summary of the Invention:

The object of the present invention is to provide a device for connecting a data processing device with a telecommunications system which overcomes the above-noted deficiencies and disadvantages of the prior art devices and methods of this

15   general kind, and which enables a simple connection between the telecommunications system and the server for the provision of telecommunications applications.

With the above and other objects in view there is provided, in

20   accordance with the invention, a connection device which connects a telecommunications system and a data processing device providing telecommunications applications. Each of the telecommunications system and the data processing device having a switching network for through-connecting a respective

25   telecommunications application to a user connected to the telecommunications system. The connection device for

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connecting the telecommunications system to the data processing device is directly connected between the respective switching networks.

5   According to the present invention, a switching network of the telecommunications system is connected with the aid of the connection device to a switching network of the data processing device - in particular a CTI server based on the conventional S.100 and H.100 specifications - or specific

10 switching points of the relevant switching networks are directly interconnected. For this purpose, according to the invention, the telecommunications system has a first interface for direct connection of the switching network of the telecommunications system to the switching device according to

15 the invention. The first interface, which represents one or more direct switching points of the switching network, is controlled via a virtual subscriber which is set up in the telecommunications system and is assigned to the switching device.

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The advantage of the direct interconnection of the two switching networks according to the invention is that hardware cost is substantially reduced compared with the state of the art. The elimination of the connection modules required

25 according to the state of the art in both the

telecommunications system and the data processing device

results in cost savings compared with the state of the art.

Furthermore, fast switching occurs between the switching

5   network of the telecommunications system and the switching

network of the data processing device, e.g. via the Siemens AG

SWTI switching network module, since the high-cost line

signaling, e.g. during a connection set up or cleardown, can

be dispensed with.

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In accordance with an added feature of the invention, the

connection device is configured to perform a bi-directional

conversion between a data format supported by the switching

network of the telecommunications system and a data format

15   supported by the switching network of the data processing

device.

In accordance with an additional feature of the invention, the

connection device in each case interconnects at least one time

20   slot of the respective switching networks.

One or more switching points of the relevant switching

networks are advantageously interconnected by the switching

device according to the invention. In TDM switching networks

25   (Time Division Multiplex), specific time slots of the

switching network of the telecommunications system are

directly interconnected by means of the switching device with specific time slots of the switching network of the data processing device.

5   During the data transmission, the switching device carries out a bidirectional conversion between the data formats supported by the two systems, i.e. the switching device carries out an interface conversion between the switching network of the telecommunications system and the switching network of the 10   data processing device or the relevant switching points.

In accordance with another feature of the invention, the connection device is configured to implement voice data applications between the telecommunications system and the 15   data processing device. The switching device according to the invention is advantageously used by the data processing device for an implementation of speech applications, such as speech recognition and text-to-speech applications.

20   In accordance with a further feature of the invention, a virtual subscriber is set up in the telecommunications system and assigned to the connection device, for controlling the connection device. In other words, in order to control the specific time slots or switching points of the 25   telecommunications system, the switching point(s) must be defined as a virtual - preferably exclusively software-

implemented - subscriber of the telecommunications system. This/these switching point(s) can thus be addressed in the same way as a conventional extension of the telecommunications system.

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In accordance with again an added feature of the invention, a separate connection is provided to transmit control and monitoring information between the telecommunications system and the data processing device according to the CSTA protocol.

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In other words, the switching points used in the telecommunications system are controlled and monitored via a second interface, advantageously via the standardized CSTA protocol (Computer Supported Telecommunications Application).

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In accordance with again another feature of the invention, the connection device is a separate device. In the alternative, the connection device is implemented as an interface unit in the data processing device.

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Other features which are considered as characteristic for the invention are set forth in the appended claims.

Although the invention is illustrated and described herein as

25   embodied in a device for connecting a data processing device to a telecommunications system, it is nevertheless not

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intended to be limited to the details shown, since various

modifications and structural changes may be made therein

without departing from the spirit of the invention and within

the scope and range of equivalents of the claims.

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The construction and method of operation of the invention,

however, together with additional objects and advantages

thereof will be best understood from the following description

of specific embodiments when read in connection with the

10   accompanying drawings.

Brief Description of the Drawings:

Fig. 1 is a structural diagram schematically representing a

prior art system;

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Fig. 2 is a block diagram schematically representing a

connection between a telecommunications system and a data

processing device according to the invention; and

20   Fig. 3 is a structural diagram illustrating an embodiment of

the present invention.

Description of the Preferred Embodiments:

Referring now to the figures of the drawing in detail and

25   first, particularly, to Fig. 1 thereof, there is seen a prior

art CTI configuration. The configuration comprises a

telecommunications system 11 and a CTI server 12 - in particular a media framework designed according to the known S.100 and H.100 specifications - for the provision of telecommunications applications for the telecommunications

5   system 11 or subscribers - not shown - assigned to the telecommunications system 11.

The telecommunications system 11 sets up a connection to the external CTI server 12 via a switching network 13. The

10   interfaces for data transmission are in each case formed by connection modules 3 and 4 of the telecommunications system 11 or by connection modules 7 and 8 of the CTI server 12. Data transmission can be carried out, for example, according to a time-slot-oriented continuous transmission method and/or

15   according to a packet-oriented transmission method.

In the CTI server 12, a connection is set up via the switching network 14 - preferably configured according to the H.100 specification - with function units FE - frequently referred

20   to in the literature as 'Resource Boards' - which implement the relevant telecommunications applications - e.g. speech recognition (ASR = Automatic Speech Recognition) or text-to-speech (TTS). These function units FE access application software A-SW which controls the relevant telecommunications

25   applications via an interface S.100-API (API = Application Programming Interface). The application software A-SW is in

turn connected via suitable interfaces TAPI (Telephony

Application Programming Interface) and TSP (Telephony Service

Provider) to the telecommunications system 11. Information is

transmitted via these interfaces according to the CSTA

5   protocol (CSTA = Computer Supported Telecommunications

Application) for control and monitoring between the

telecommunications system 11 and the CTI server 12.

Fig. 2 shows a structural diagram schematically representing a

10 connection between the telecommunications system 11 and the

CTI server 12 according to the invention.

The switching device 10 according to the invention

interconnects the relevant switching networks 13 and 14 or

15 specific switching points of the switching networks 13 and 14

of the telecommunications system 11 and the CTI server 12.

These switching points correspond, for example in a TDM-

oriented switching network, to one or more time slots, which

are in each case directly interconnected via the switching

20 device 10.

To connect the switching device 10 according to the invention

to the telecommunications system 11, the telecommunications

system 11 has a first interface 15, which directly provides

25 one or more switching points of the switching network 13. In

order to address the switching points by means of the

telecommunications system 11 or by means of a control unit - not shown - of the telecommunications system 11, a virtual subscriber is set up in the telecommunications system 11 via a, preferably software-implemented, subscriber device 16. The

5 interface 15 is addressed via the virtual subscriber, for example via extensions of the telecommunications system 11 or via the CTI server 12 by means of the CSTA protocol via a second interface 17 of the telecommunications system 11.

10 The switching device 10 according to the invention is advantageously an autonomous device which is connected externally between the telecommunications system 11 and the CTI server 12 or is alternatively implemented as an internal interface in the CTI server 12.

15 Referring now to Fig. 3, there is shown an embodiment of the present invention. As compared with the prior art Fig. 1, the connection modules for connecting the telecommunications system 11 to the CTI server 12 are dispensed with. The further

20 components shown in Fig. 3 have already been explained with reference to Figs. 1 and 2.

With the aid of the switching device 10 according to the invention, which can be implemented, for example, with the

25 Siemens AG TEB SWT1 switching network component, the external

CTI server 12 is connected as an extension box via a standard connection cable to existing telecommunications systems 11.

The switching device 10 according to the invention is

5   incorporated as a basic hardware component, for example for a S.100 media server as a resource for a call channel, into a suitable S.100 environment (for example, Dialogic/Microsoft S.100 API).